

CLAIMS

1. A process for treating the coating of bottles made of thermoplastic material coming from a plant where each bottle is held by its aperture by means of evenly distributed specific gripping devices moved by a conveyor chain, dipped
5 into a resin solution in a solvent in order to create a protective and impermeable-to-gas layer on the outer surface of the bottle, excess paint is appropriately removed, and said solvent is evaporated, the drying process characterised by the following steps:
 - i. Feeding the bottles through a first area (2') of the treatment furnace located
10 under spaced out heating elements;
 - ii. Providing an air flow from outside the treatment furnace into said first area (2') of the furnace directed upwardly, first, around the bottles and, then, around said heating elements;
 - iii. Sending said bottles, after feeding them under the heating elements, into a
15 second area of the furnace, which is located above said heating elements;
 - iv. Allowing the airflow, which has already flown around said heating elements, to flow around the bottles in said second area;
 - v. Mixing at least part of the hot airflow flowing out of said second area with air obtained from outside before sending a refreshed airflow to said first area of
20 the furnace.
2. A process as claimed in claim 1 wherein said heating elements consist of many infrared lamps (IR) of the medium wave type.
3. A process as claimed in claim 2 wherein said infrared lamps are arranged in several distinct clusters.
- 25 4. A process as claimed in claim 1 wherein the temperature of said airflow in said first area (2') ranges from 50 to 70°C, while the speed of the airflow around the bottles is included between 1,5 and 2,5 m/min.
5. A process as claimed in claim 4 wherein said parameters are controlled by fittingly modifying the flow rate of the airflow coming from outside the plant and
30 the amount of hot air coming from said second area, which is mixed with said airflow.
6. A process as claimed in claim 1 wherein said airflow, which passing around the

heating elements has reached a temperature between 60°C and 80°C, meets, at a speed included between 1,5 and 2,5 m/s, in the second area of the furnace above the heating elements, the previously treated bottles and keeps them at a temperature lower than 65°C.

- 5 7. A process as claimed in claim 1 wherein power emitted by the lamps, airflow, bottle treatment time, and air circulation % in the furnace are all adjusted so that 75 to 95% of the solvent is removed from the coating in the first area of the furnace, while the remaining amount of solvent is removed in the second area of the furnace.
- 10 8. A process as claimed in claim 7 wherein the amount of solvent removed from the coating is included between 85 and 92%.
9. A process as claimed in claim 2 wherein the hot airflow exiting said second area after having completely dried the coating is recycled in the furnace of an amount comprised between 0 and 90%.
- 15 10. A process as claimed in claim 5 wherein the amount of time the bottles stay in front of the lamps is included between 15 and 30 sec.
11. A process as claimed in claim 5 wherein the amount of time the bottles stay in front of the lamps equals 25 sec.
12. A device for treating the coating of bottles made of thermoplastic material in
20 accordance with the process described in claim 1 consisting of a chamber (1), delimited by walls (8, 15, 17, 18), comprising the following elements:
 - i. A first lower area (2) for treating bottles (4), and a second upper area (5) for treating bottles;
 - 25 ii. A furnace (2') placed inside the lower area (2) equipped with heating elements (3) suitable to emit thermal radiation; this furnace is delimited by a wall (14), part of the outer wall (17), an upper wall (10), and a lower wall (11) – both suitable to reflect the thermal radiation and allow gas to flow through;
 - iii. Means suitable to create a flow of ambient air (6) and to control the flow
30 rate;
 - iv. A chamber (12) suitable to receive said airflow (6); delimited by walls (8, 15) and by a door (7) communicating with a vertical duct (19), which is

delimited by a wall (8) and an element (9) that in turn communicates with said lower area (2) to permit air flow from the chamber (12) to said area (2);

- 5 v. A chain having a plurality of chucks (13) that grip and hold the bottles in the furnace (2') when in proximity of the furnace and passing outside of it parallelly to the wall (14) provided with an opening adapted to allow the passage of the neck of the bottles, making it possible to keep the neck of the bottles outside the furnace (2') and to divide the airflow (6).

10 13. A device as claimed in claim 12 wherein the door (7) separates the inlet chamber (12) of the air from an outlet chamber (16) from which the air, after passing from the lower area (2) to the upper area (5) and being heated by the heating elements (3); flows out of the chamber, said door (7) being adapted to be operated to inlet part of the hot air flowing out of the outlet chamber (16) into the inlet chamber (12).

15 14. A device as claimed in claim 12 wherein said wall (14) also serves to deflect part of the airflow coming from the duct (19) to area (2) to send it to the chucks (13) to cool the neck of the bottles.